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Reviews

The Ḥphags-pa letter ꡂ <ḥ> and laryngeal phenomena in Mongolian and Chinese[1]

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Introduction

In 1269 fulfilling the request of emperor Qubilai Qaγan (1215–1294) his imperial preceptor the Tibetan lama Ḥgro mgon ḥphags pa blo gros rgyal mtshan (1235–1280) presented to the throne a new script intended primarily for writing Mongolian, but useable for all the languages of the realm. Ḥphags pa lama's new script was in essence a modified form of the Tibetan alphabet, written vertically, with new characters added for those sounds lacking in Tibetan. Documents written with the Ḥphags-pa script have long been recognized as important sources in the study of both Mongolian and Chinese historical phonology. However this script is itself beset with problems of interpretation. One letter whose interpretation has been somewhat controversial is the letter ꡂ <ḥ> which corresponds to the Tibetan letter ཧ <ḥ>. Summarizing the reigning interpretation of this letter Svantesson et al. suggests that in Mongolian texts this character "may have been a glottal stop, or just a hiatus marker" (2005: 110). This analysis is similar to mistaken interpretations of the Tibetan letter ཧ <ḥ> (e.g. Matisoff [2003: 116] suggests glottal stop, Beyer [1992: 43 note 6] and Coblin [2002: 169] a zero initial) but is at odds with the actual value of this letter in Old Tibetan as a voiced velar fricative [ɣ] (Hill 2005). A change in the value of the Tibetan letter <ḥ> changed from Old Tibetan (circa 650) to Tibetan as spoken by Blo gros rgyal mtshan in the 13th century would be of no surprise a priori, nor would a difference in the value of this Tibetan letter in the 13th century and the value of the corresponding letter in Ḥphags-pa. However, if there were a mismatch between the values of the Tibetan letter <ḥ>, in either Old Tibetan or 13th

1 I would like to thank Tristan Brown, and Alexander Vovin for invaluable help on this paper.

century Tibetan usage, and the Ḥphags-pa letter <ḥ> in Mongolian, this mismatch should be explained.

In contrast, a match between the phonetic value of the Tibetan letter <ḥ> and the Ḥphags-pa letter <ḥ>, would neither be surprising or demand explanation. Miller (2002) summarizes and adds his voice to an alternate strain of scholarship which sees the Ḥphags-pa letter <ḥ> as representing a voiced fricative of some kind. This analysis fits much better with the value of the corresponding letter in Tibetan.

In the Mongolian Ḥphags-pa materials the letter <ḥ> occurs both word initially, and word internally, in surveying the relevant data and previous discussions in the literature it is useful to treat these two uses separately.

Word initial ḥ

Ligeti collects the following examples of initial <ḥ> in Mongolian Ḥphags-pa texts (1961: 206–207). I give these examples in the traditional transcription of Written Mongolian (WM), and in Svantesson et al.'s (2005) transliteration of the Ḥphags-pa script (PM); with the change that <ḥ> is written as <ḥ>. It should be noted that like the Mongolian script itself the traditional transcription of Mongolian does not distinguish Old Mongolian /h/ from Old Mongolian /g/. This fact is of no phonetic meaning. The Mongolian script similarly does not distinguish /t/ from /d/ or /a/ from /e/ but in these cases they are traditionally distinguished in transcription.

WM üge, PM ḥy-ge 'word'
WM ügeber, PM ḥy-ge-ḥer 'word' (instrumental)
WM üges, PM ḥy-ges 'words'
WM ügülegsen, PM ḥy-gu-leg-sen 'spoken'
WM ügüleldükün, PM ḥy-gu-lel-du-k^{h}un 'speak to one another kun'
WM ügegü, PM ḥy-geḥy 'without'

WM ibegel, PM ḥi-he-ḥen 'protection'
WM ibegel-dür, PM ḥi-heḥen-dur 'protection' (dative-locative)
WM irgen-e, PM ḥir-ge-ne 'people' (dative-locative)

As can be seen from these examples, the Ḥphags-pa letter <ḥ> as an initial corresponds to vowel initials in Written Mongolian. Elsewhere in the Ḥphags-pa script Mongolian material some of these words with initial <ḥ>

ḥ- are indeed written with an initial vowel (i.e. the character ᠤ , e.g. *i-he-ḥen,* WM *ibegel* 'protection'). Both the correspondence between initial Ḥphags-pa <ḥ> and Written Mongolian vowel initial, and the alternation between ᠷ *ḥ-* and ᠤ within Ḥphags-pa texts lead Jaγunasutu to assign <ḥ> the value of a zero initial, and regard its variation with ᠤ as meaningless.

> 在八思巴字蒙古語資料中、在它們之前的任何符號 — , ′, -, [i.e. ᠷ, ᠤ, and no consonant initial graph] 都祇能是零聲母標誌、所以它們才能交替並存。
> [In the Ḥphags-pa script Mongolian material, any of the symbols ᠷ, ᠤ, Ø, appearing in front of these [words] can only be markers of zero initial, therefore they may coexist as alternates] (Jaγunasutu 1989: 32).

This line of reasoning comes across two difficulties. The first is that Written Mongolian is known to have zero initial where Middle Mongolian has initial *h-* (Pelliot 1925). So, the fact that Written Mongolian has a zero initial is not itself sufficient to show anything about other varieties of Mongolian. Second, to regard ᠷ *ḥ-* and zero ᠤ as free variants of each other does nothing to account for their attested distribution.

The letter ᠷ *ḥ-* does not occur randomly in variation with ᠤ. As can be seen from the examples above, all examples of initial ᠷ *ḥ-* occur before the vowels /i/ and /ü/ in words which in Written Mongolian begin with vowels.[2] This suggests that words with initial /i/ and /ü/ were somehow articulated differently than the other vowels in the variety of Middle Mongolian underlying the Ḥphags-pa materials. To explain the presence of *ḥ-* only before *i* and *ü* Ligeti suggests that:

> Cette notation [...] peut être expliquée seulement comme une particularité phonétique mongole qu'on a tenu à noter [...] le *glottal stop* (ou une consonne faisant l'effet acoustique de ce dernier) précédant l'initiale *i* (ou *ü*).
> [This notation ... may only be be explained as a phonetic particularity of Mongolian which was intended to indicate ... a *glottal stop* (or a consonant which had the acoustic effect of the latter) before initial *i* (or *ü*)] (1961: 230).

2 The letter does *ḥ-* appear to mark vowel initials in the short text studied by Tuna and Bosson (1962). In this text the letter ᠤ does not appear.

The main reason why Ligeti sees these examples as glottal stops, is that in Chinese texts the Ḥphags-pa letter <ḥ> is usually taken to mark a glottal stop (Ligeti 1961: 229, Nakano 1971: 75–80, Coblin 2007: 45–46)[3]. In further support of his analysis Ligeti points to Bobrovnikov's description of Kalmyk, where:

> Буква (*и*) въ началѣ слова произносится съ придыханіемъ какъ *и*, или *hi*. Напр.  *йиргенъ* или *hirgen* народъ. [The letter <i> in the beginning of a word it is said with aspiration as i or hi. For example <irgen> *jirgen* or *hirgen* 'people'] (Bobrovnikov 1849: 8).

However, this descriptions of aspiration before initial /i/ would seem to fit better with an analysis of <ḥ> as /ɣ/, /ɦ/ or /h/ than with Ligeti's glottal stop /ʔ/.

Ligeti also points to what he takes to be the same phenomenon in Khalkha (Ligeti 1961: 230), where

> bei energischer artikulation vor dem vokale, an deutlichsten vor *u*, *ʊ̈*, *ü*, und *i*, [wird] ein schwacher hauch hörbar. Wir haben also im khU. den schwach gehauchten vokaleinsatz (gradual glottid).
> [with energetic articulation before the vowels, especially before *u*, *ʊ̈*, *ü*, and *i*, a weak aspiration is audible. We have thus a weakly aspirated vowel onset (gradual glottid) in Ugra Khalkha] (Ramstedt 1902: 36).

The phonetic term 'gradual glottid' has gone into disuse. Baynes provides the following definition: "The glottid is gradual [...] when flatus passes through the vowel position before the chords are sufficiently approximated for voice or after they are separated" (1888), and sets it on a scale 1. clear glottid, 2. gradual glottid, 3. check glottid (including the German *Knacklaut* and Arabic *hamza* [ʔ]), 4. a "bleat" as seen the the Arabic *'ayin* [ʕ]. A potential *locus classicus* for the term 'gradual glottid' can be found

3 Poppe rejects the idea that <ḥ> represents a glottal stop in Mongolian (1957: 22), and even questions whether it did so in Chinese, citing the work of Hope (1953). Poppe suggests that the vowels *i* and *ü* "were pronounced with greater tenseness" (1957: 32). Somewhat inconsistently Poppe believes that intervocalically <ḥ> does represent zero, but initially it marks this greater 'tenseness' relative to the other vowels.

in Sweet's phonetics handbook, where it is opposed to the glottal stop as a form of vowel initial.

> The glottis is gradually narrowed passing through the various positions for breath and whisper till voice is produced. This gives the 'gradual' beginning ([ʜ]a) which is the ordinary way of beginning a vowel [...]. If the stress begins on the glides they are at once recognised a independent elements, [ʜ] giving (ʜ), the ordinary aspirate or letter *h*. (Sweet 1877: 63).

One may doubt whether Ramstedt's "schwach gehauchten vokaleinsatz" is really the same as "the ordinary way of beginning a vowel". This much is clear, Ramstedt heard some kind of aspiration, but has chosen to describe it as other than an [h]. Ligeti is mistaken to equate Ramstedt's 'gradual glottid' with a glottal stop.

Bese suggests linking Ligeti's glottal stop interpretation of the Ḥphags-pa letter <ḥ> with a phenomenon in the the Western Khalkha dialect which he describes. In this language vowel initial words are subphonemically articulated with a "*glottal plosive consonant* [...] most easily observed before, *i*, *e*, [and] *u*" (1961: 279 emphasis in original). Bese provides the examples: <ene> *ʔen* 'this', <uruγul> *ʔurūl* 'lip', <uran> *ʔurǎ* 'craft', and <ire-> *ʔir-* 'come' (1961: 278). As in the cases of Bobrovnikov (1849) and Ramstedt (1902), here too one has reason to wonder whether the sound described is in fact a glottal stop. Bese remarks that "A foreigner is sometimes apt to hear this *glottal plosive consonant* as χ or ɢ." (1961: 278 note 6, emphasis in original). Ladefoged and Maddieson report that glottal stops are articulated in the majority of languages as "a very compressed form of creaky voice or [...] stiff phonation" (1996: 75). The associated wave forms show little turbulance, in direct contrast to fricatives, such as χ, which are indeed defined by their turbulant airstream (Ladefoged and Maddieson 1996: 137). Perhaps Bese's 'glottal plosive' is also in fact some kind of fricative.

Bese (278 notes 7 and 8) cites what he takes to be similar phenomena in the Chahar Dialect studied by Hattori (1951), and the Kharachin Dialect studied by Nomura (1957). Hattori describes his 'glottid phoneme' in these terms:

> 以上の考察によって、蒙古語のこの方言の語頭音節はCV（即ち一つの子音音素十一つの母音音素）であるか、それで始まることが明かとなるが、母音で始まるように見える場合もある。

これらの母音はCVのVに該当する母音よりもやや長く、普通「はつきりした声音て」<clear beginning>で始まり、強い発音では声門破裂音で始まることがある。私は、これらの母音の初めの部介或いは破裂音に該当する一つの子音音素/'/を想定し、「声帯音音素」<glottid phoneme>と呼ぼうと思う。

[According to the foregoing inquiry, in this dialect of Mongolian the syllable initial is CV (i.e. one consonant phoneme + one vowel phoneme); and with that the onset is clarified. Yet there are also cases which seem to begin with a vowel. These vowels are slightly longer than the vowels which occur as the V in CV initials, beginning with normal 'clear beginning', they have an onset with a strong sound, a glottal plosive. Analyzing a consonant phoneme /'/ which corresponds to a plosive or part of (部介) these vowel onsets, I would like to call it a 'glottid phoneme'.] (Hattori 1951: 81).

For Hattori, this glottal initial is as much a product of the phonemic analysis as it is phonetic accurancy. He cites the vowel initial of English, German, and Japanese as being the same phenomenon differently analyzed. These parallels makes it beyond question that Hattori is in fact describing a glottal stop [ʔ]. This glottal phoneme occurs, by definition, before all vowels.

Nomura does not provide detail about the sound he heard calling it "a glottid phoneme which corresponds phonetically with the 'clear beginning'", and citing Hattori (1951) for his use of these terms (Nomura 1957: 133). One must take him at his word and assume he too is describing a glottal stop [ʔ]. In his materials this sound occurs before /i, a, u, ä, ö, j/ and /w/.

In summary, of the various phenomena which have been linked to Ligeti's conjecture that the initial Ḥphags-pa letter <ḥ> represents initial glottal stop, in the dialects described by Bobrovnikov, Ramstedt, and Bese this 'glottal stop' is not a stop, but some kind of fricative, and occurs with a distribution similar to that of the initial Ḥphags-pa letter <ḥ>, i.e. primarily before /i/ or /ü/. In contrast, the 'glottal phonemes' of Hattori and Nomura are in fact glottal stops [ʔ], and they occur before all or most vowels. There is no particular reason to link these to the Ḥphags-pa letter <ḥ>. None of the evidence discussed so far precludes the possibility that the initial Ḥphags-pa letter <ḥ> represented a glottal stop, but it also in no way suggests it. If one were to infer a value for <ḥ> from these data it

would be [h] or [ɦ], with [ɦ] as a better candidate because the Ḥphags-pa letter ཧ <h> already represented [h]. However, because these dialects reflect a possible typological similarity rather than a phonetic correspondence at the lexical level, their witness alone is insufficient to establish the phonetic value of initial <ḥ>.

It is reasonable to accept that the occurance of both <ḥ> and zero as the initial of some words, and the restriction of <ḥ> to before /i/ and /ü/ implies phonetic information about these initials. The precise phonetic interpretation of this information should be compatible with the use of <ḥ> intervocallicaly. The phonetic value of initial <ḥ> will be returned to after consider this letter's use intervocalically.

Intervocalic <ḥ>

Intervocalic <ḥ> corresponds regularly to Old Mongolian /h/ (Poppe 1957: 32; Svantesson et al. 2005: 128–139). Here are the relevant examples from the glossary in Svantesson et al. (2005), in the traditional transcription of Written Mongolian (WM), Svantesson et al.'s Old Mongolian reconstruction (OM), and a transliteration of the Ḥphags-pa script transcriptions (PM).

WM aγula, OM *ahula, PM aḥula 'mountain'
WM aimaγud, OM *aima(h)ut, PM aimaḥud 'districts'
WM baγu, OM *pahu, PM baḥu 'to go down'
WM čaγan, OM *čʰakahan, PM čʰaqaḥan 'white'
WM čilaγu/n, OM *čʰila(h)u/n, PM čʰilaḥun 'stone'
WM deger-e, OM *tehere, PM deḥere 'above'
WM doloγan, OM *tolaha/n, PM doloḥan 'seven'
WM egüde/n, OM *ehyte/n, PM ıḥuden 'door'
WM görögesün, OM *kørehesyn, PM gørøhe 'beast'
WM irüger, OM *hiryher, PM hiruḥer 'blessing'
WM ǰaγun, OM *čahu/n, PM ǰaḥun 'hundred'
WM ǰirγoγa/n, OM *čirkoha/n, PM ǰirqoḥan 'six'
WM öger, OM *øher, PM øḥer 'self'
WM qalaγun, OM *kʰalahun, PM qalaḥun 'warm'
WM saγu, OM *sahu, PM saḥu 'to sit'
WM sibaγun, OM *sipahu/n, PM šibaḥun 'bird'
WM üǰügür, OM *yčyhyr , PM yǰuḥur 'point'

The phonetic value of the letter <ḥ> and how the reflex of the Old Mongolian phoneme /h/ was pronounced intervocalically in Middle Mongolian are essentially the same question. There are several schools of thought on this matter. One suggests that the the Old Mongolian intervocalic /h/ had completely disappeared in Middle Mongolian, and the letter <ḥ> represents 'hiatus', i.e. the fact that the vowels on either side of it do not coalesce into a diphthong. A second view holds that /h/ was still pronounced in Middle Mongolian with some suggesting a glottal stop and others suggesting a fricative. Another view commonly held in conjuction with one of the previous two is that at least in some cases the letter <ḥ> is used to mark a long vowel. Miller (2002) cites and summarizes in a convenient fashion the the various positions taken by scholars over the years.

In a characterisitc example of the 'hiatus' view of the letter <ḥ> used intervocalically Poppe writes that "In the Yüan epoch, · [ḥ] in intervocalic position served to indicate a hiatus between two adjacent vowels belonging to two separate syllables" (1957: 23). Miller (2002: 185–186) suggests two reasons that researchers have entertained this interpretation. The first is the false notion that the cognate Tibetan letter <ḥ> represented a 'vocalic support' and had no phonetic value. The second probable reason for the hiatus interpretation is that in Sinograph transcriptions of Middle Mongolian sequences of the type VhV are often written simply as VV, e.g. 亦 啞 額 <yì dié é> /idee/ corresponding to Written Mongolian *idege* 'food' (Saitō 2003: 105). Similar transcriptions also occur in the Arabic material, e.g. ایداان <âydâân> /idään/ WM *idegen* 'food' (Saitō 2003: 112).

Glottal Stop

Ligeti in some cases extends his interpretation of <ḥ> as an Anlaut glottal stop discussed above to intervocalic position.

Long Vowels

Poppe suggests that "It is possible, however, that the sign · [<ḥ>] between identical vowels (as in q·an) served to indicate long vowels" (Poppe 1957: 23). In support of this claim he cites Clauson and Yoshitake (1929) as well as a letter from and a conversation with Clauson. Clauson's reason for suggesting that <ḥ> is used to mark long vowels is that in the Ḥphags-pa transliteration of Sanskrit dhāraṇī it is used to do so. This use of <ḥ> is based on the use of a small subscribed <ḥ> in Tibetan script transliterations of Sanskrit to mark long vowels (Clauson and Yoshitake 1929: 859). An objection can be raised to this line of argument. The Ḥphags-pa script

was developed as a script primarily for Mongolian, and its use for other languages is secondary. Only one document in Ḥphags-pa, the Mògāokū 莫高窟 epigraph, is extant in Sanskrit (Nakano 1971: 147). To argue on the basis of the use of the Ḥphags-pa script in this rather marginal instance, that the letter <ḥ> represents a long vowel also in Mongolian is to make too much of the evidence. The letter <ḥ> is not used to mark long vowels in Tibetan. Tibetan has no long vowels. It is more likely that the use of this letter in Mongolian would be consistent with its use in Tibetan, than its use in Sanskrit.

Ligeti also believes that medial <ḥ> to indicate a glottal stop and to indicate vowel length can be rigorously differentiated.[4]

> L'orthographe syllabique de l'écriture 'phags-pa [Ḥphags-pa] nous permet de distinguer sans difficulté (sauf le cas où l'écriture est trop serrée) les orthographes *a·a* et *ā*. S'il s'agit de *ā*, le *a-čhuṅ* [ḥ] est collé au signe de la consonne précédante, lorsqu'on a affaire à *a·a*, les deux signes sont séparés par un petite espace.
> [The syllabic orthography of Ḥphags-pa permits us to distinguish without difficulty (except in the case where the writing is too tight) the spellings *a·a* and *ā*. When it is *ā* the <ḥ> is connected to the preceding consonant sign, when it is *a·a* the two signs are seperated by a small space.] (Ligeti 1961: 236).

Ligeti suggests four reasons why <ḥ> should be considered as marking long vowels. 1. The Tibetan letter <ḥ> is used to mark long vowels in Sanskrit. 2. The Ḥphags-pa letter <ḥ> is used to mark long vowels in Sanskrit in the 居庸關 Jūyónguān inscription. 3. The letter is rarely used in Chinese to indicate a long vowel. Ligeti gives the example *bǎo* 寶, which he transliterates as *bō*. Ligeti mentions that this character is more frequently written *baw* (1961: 235).

The first two points have been treated above. It is clear that the Ḥphags-pa letter <ḥ> is used to mark long vowels in Sanskrit because the Tibetan letter <ḥ> is used to mark long vowels when transcribing Sanskrit. These two points amount to one point, and indeed a week point consid-

4 Ligeti also suggests that in the case of differing vowels perhaps a diphthong is intended, "dans l'écriture tibétaine, le *a-čhuṅ* [ḥ], en cette même position, peut servir à désigner, en tant que «support semi-vocalique», une dipthongue. [in the Tibetan script ḥ, in this same position can serve as a 'semivowel support', to designate a dipthong]" (1961: 233). This view, can however be rejected since it is based upon a misunderstanding of the use of the letter <ḥ> in Tibetan.

ering the use of this convention in only one document. It is worth pointing out also that in the Tibetan practice the letter <ḥ> is written small and beneath an *akṣara* when it represents a long vowel. Since the Ḥphags-pa script is vertically arranged whereas the Tibetan script is horizontally arranged this vertical orientation of a diacritic marking long vowels in the Ḥphags-pa script would be expected to be small and written to the side. Ligeti's third point, that <ḥ> is also used to mark long vowels in Ḥphags-pa Chinese appears to be a view unique to him. The Ḥphags-pa transcription of the character *bǎo* 寶 , which he transliterates as *bō*, would be more precisely transliterated as <boḥ>, implying a pronunciation such as [bofi] or [boɯq].

Old Mongolian /VhV/ does yield /V:/ in the modern Mongolian languages. Hence, to suspect as Svantesson et al. (2005: 110) do that <ḥ> represents vowel length is not unreasonable. However, Ligeti suggests that the presence or absence of a small space was used to mark a glottal stop on the one hand and a long vowel on the other hand. There is no reason to believe that this distinction is phonetically meaningful, based either on Tibetan orthographic practice or on modern Mongolian phonology. That a script would use a small space to consistently distinguish a more or less random variation between the pronunciations /V:/ and /VʔV/ is at face value an implausible senerio. It is perhaps sensible to distinguish these two orthographic forms in transcription, but until better evidence can be brought to bear suggesting this distinction is phonetically meaningful, it is best to see it simpy as the meaningless variation in the length of a space that can occur when one writes by hand.

Fricative

A minority of scholars hold the alternative view that the letter <ḥ> was still pronounced in Middle Mongolian as some kind of fricative. Rybatzki writes: "The status of the hiatus (') is problematic, in that it is in almost perfect complementary distribution with h (= x < *x) and could possibly still synchronically be regarded as an allophone of the latter" (2003: 64).

Evidence for the actual pronunication of /-h-/ in Middle Mongolian is available from the Sinograph transcriptions of Mongolian. In addition to the Sinograph transcriptions of Old Mongolian -VhV-, as VV there are other transcriptions which indicate that this segment was still pronounced. In front vocalic words Old Mongolian -h- frequently is transcribed as -y-, e.g. 亦 哩 延 <yì dié yàn> /ideyen/ WM *idegen* 'food' (Saitō 2003: 106) or 迭 兀 余 延 <dié wù yú yàn> /deuyuyen/ WM *degüyügen* 'son (reflexive genitive/accusative)' (Saitō 2003: 115 n. 15). Transcription with

<y> for Old Mongolian /-h-/ is also found in Arabic material, e.g. ایایان <âydâyân> /idäyän/ WM *idegen* 'food', تولایان <twlâyân>/tölüyän/ WM *tölügen* 'payment, recompense' (Saitō 2003: 112), or نییو <niyyw> /niyu/ WM *niγu-* 'hide, conceal' (Saitō 2003: 117 n. 20). Old Mongolian /-h-/ is also transcribed as -w- 中忽舌鄰都瓦兒 <middle hū tongue lín dōu wǎ ér> /qorinduwar/ WM *qorinduγar* 'twentieth' (Saitō 2003: 112), بوواسویلی <bwwâswny> /böwäsüni/ WM *bögesün-i* 'louse' (Saitō 2003: 117 note 20). Pointing to such variation Saitō concludes that the transcribed segment was still pronounced, and in these cases "モンゴル語の音声史においてこの[ɦ]を仮定するのは音声学的に見て極く自然であり postulating this [ɦ] in the Mongolian historical phonology is from a phonetic point of view very natural]" (2003: 109).

Besides these cases of reflex of Old Mongolian /-h-/ being transcribed with <y> or <w>, there are also instances transcribed with <h>. The opening lines of the *Secret History* has 成吉思中合罕 <chéng jí sī middle hè hǎn> /činggis qahan/ WM *činggis qaγan* 'Genghis Khan' (Kuribayashi and Choijinjab 2001: 6). In the Leiden manuscript are such Arabic transcriptions as برهور <barihuw°r> for Written Mongolian *bariγul* 'handle, grip' (67b-13-5), or کوهه <kuw°hah°> for WM *köge* 'hindrance' (67a-1-4) (Saitō 2006, cf. also Pelliot 1925: 249 n. 2). Even in the Ḥphags-pa script itself <h> occurs "[i]n the interior of words [...] in the words *ihe·en*/*·ihe·en* [*iheḥen*/*iheḥen*] protection, and *ihegč'i* protector, where it correspond to Mo. [Written Mongolian] *g*" (Poppe 1957: 31). In fact, the corresponding verbal root in Written Mongolian is *ibe-* 'protect' (Poppe 1957: 124). Thus, this example shows the *b* ~ *g* alternation typical for Old Mongolian *-h-*. As mentioned above, the same segment is also written with <ḥ> in this word (PM ḥi-heḥen-dur, WM ibegel-dür). In Persian loans from Mongolian the reflex of Old Mongolian /-h-/ is regularly reflected as <h>, e.g. Persian *keher* < Written Mongolian *keger-e* 'desert' (Minorsky 1957: 68). In all of these cases the reflex of Old Mongolian /-h-/, usually taken to be a mere hiatus in Middle Mongolian, has been transcribed as <h>, indicating that it must have been pronounced something like [h].

Miller suggets that even those examples of Old Mongolian /VhV/ transcribed with Sinographs as VV, which most likely gave rise to the 'hiatus' theory, may in fact be chimerical, and better understood as VɦV.

> [T]he most frequently encountered Chinese transcription syllables found in these texts in positions corresponding to the so-called Middle Mongolian intervocalic hiatus are Chin.[ese] 額 é < M[id-

> dle]chin.[ese] **ngə*, and Chin.[ese] 兀 *wú* < M[iddle]chin.[ese] **ngu*, i.e., both morphemes in an earlier stage of the language had been syllables with an initial nasal-velar consonant. [...] we may conclude that no bold leap of the imgaination is required in order to equate a surviul of this initial into O[ld]Man.[darin] with the [h] attested in the Q [Ḥphags-pa] sources. (Miller 2002: 189–190).

However, these two characters 額 and 兀 in addition to being used to transliterate the sequences corresponding to Ḥphags-pa *ḥe* and *ḥu*, are also used to transliterate sequences corresponding to word initial vowels *e* and *u*, as can be seen from the following two examples.

> WM emegel, OM *emehel, SM 額 篾 額 勒 <é miè é lè> /emeel/ 'saddle'

> WM uɣu, OM *uhu, SM 兀 兀 <wùwù> /uu/ 'drink' (Svantesson et al. 2005: 128–139)

Although one cannot follow Miller in believing that these Chinese syllables began with [ɦ], the variation among transcriptions with zero, <y, h> and <w> is sufficient to demonstrate that the Mongolian syllables being described did themselves begin with [ɦ].

Having established that the Ḥphags-pa letter <ḥ> used intervocalically has the value of a voiced glottal fricative, it is reasonable to suggest that it also had this value in word initial position. As discussed above, of the phenomena which have been previously linked to the use of the Ḥphags-pa letter <ḥ> before the vowels /ü/ and /i/, the relevant sound in the dialects which Bobrovnikov, Ramstedt, and Bese describe is some kind of fricative, and occurs with a distribution similar to that of the initial Ḥphags-pa letter <ḥ>. In face of these facts, the phonetic value of [ɦ] can without obstacle be extended to the letter <ḥ> in all positions.

A number of additional facts are available which strengthen the supposition that <ḥ> represents [ɦ] irrespective of its place in a word. Miller draws attention to a 14th century list of the Ḥphags-pa letters, provided with Chinese equivalents.

> Describing the Q [Ḥphags-pa] script in chapter 7 of his *Shū-shǐ huì-yāo* 書 史 會 要 of 1376, Táo Zōngyí 陶 宗 儀 explicitly states that the graph Q <h̲> [Ḥphags-pa <ḥ>] is to be pronounced as

Chin.[ese] 何 *hé* < M[iddle]chin.[ese] ɣa* (Karlgren, with ɣ to be understood as [ɦ]). (Miller 2002: 188 and cf. Clauson 1958: 321).

Coblin objects that "these character equivalents of course date from much earlier than the time of the framing of the 'Phags-pa [Ḥphags-pa] script. They should not be used as ancillary evidence for the sound values of the 'Phags-pa [Ḥphags-pa] letters" (2007: 6). Although Coblin's point is well taken, Táo Zōngyí 陶宗儀 must have had some ground for equating certain characters from the traditional lists with certain letters from the Ḥphags-pa alphabet. If this reason were not the pronunciation of these letters in his own time, what could it have been?

Finally, Miller also draws attention to the fact that the character ㅇ in Korean han'gŭl as described by Sampson (1985: 126–127) and Martin (1992: 54) also indicates [ɦ] (Miller 2002: 200). Miller suggests that this character "derives from the epigraphic originals of Q and WT <h̲> [Ḥphags-pa and Written Tibetan <ḥ>]" (Miller 2002: 199). Miller provides no argument for this equation. Although it is widely thought that the Ḥphags-pa alphabet influenced the invention of Korean han'gŭl (cf. Leyard 1966), this specific equation appears not to have been previously suggested. Ledyard (1997: 58) specifically denies a Ḥphags-pa precedent for the han'gŭl of the laryngeal series. However, other instances where he does see a parallel such as Ḥphags-pa ꡂ and han'gul ㅁ seem no more plausible, and perhaps he would accept Miller's equation if it had occurred to him. The explanation for the shape of the letter ㅇ given in the *Hunmin Chŏng'ŭm* 訓民正音例 is "the outline of the throat" (Ledyard 1966: 229).

The discussion so far has repeatedly pointed to [ɦ] as the value of the Ḥphags-pa letter <ḥ>. However, its ancestor the Tibetan letter <ḥ> in Old Tiberan represented not the sound [ɦ] but instead [ɣ] (Hill 2005). These sound are probably similar enough that their disparity need not undermine the hypothesis of [ɦ] as the value of the Ḥphags-pa letter <ḥ> in Mongolian. In fact, consideration of the historical facts eliminates the discrepency altogether. The value [ɣ] for Old Tibetan is relevant to the Tibetan language before it split into various dialects, i.e. in the relatively early part of the Old Tibetan period 650–900. The Ḥphags-pa script made its appearance in 1269 long after Tibetan had begun to diverge into its various daughter languages. The relevant question for the application of Tibetan evidence to the interpretation of the Ḥphags-pa letter <ḥ> is not the letter's value in Old Tibetan, but rather how words written with the Tibetan letter <ḥ> were pronouced in the language of Blo gros rgyal

mtshan, the script's inventor, and his confrères. The imperial preceptor hailed from Sa skya in Central Tibet. I do not have any materials on the pronunciation of Tibetan in Sa skya today, let alone in the 13th century, however across Central Tibet the segment in question has generally developed into [ɦ].

Written Tibetan *ḥo-ma* 'milk'
o̲ma [ɦo̲mā], South Mustang (Kretschmar 1995 vol iv: 216)
ɦo^{3} ma^{2}, Central, Gzhis ka rtse (Jin 1958: 31)
o̲mā [ɦo̲mā], Central, Gzhis ka rtse (Haller 2000: 22)

Written Tibetan *ḥod*, 'light'
ɦø:, Skyid-grong, Lende (Huber 2005: 332)
ɦøʔ^{3}, Central, Lhasa (Jin 1958: 10)
ö [ɦœ] South Mustang (Kretschmar 1995 vol iv: 223)

Ḥphags pa blo gros rgyal mtshan used a derivative of the Tibetan letter <ḥ> in the script that bears his name to represent exactly the same sound in Mongolian that the corresponding Tibetan letter represented in his own mother tongue, i.e. [ɦ].

Middle Mongolian has an Anlaut voiceless glottal fricative, written with the Ḥphags-pa letter 𗥃 <h>, if one adds [ɦ] to the Middle Mongolian sound system this results with both [h] and [ɦ] as sound in Middle Mongolian. There are very few languages that have a phonemic distinction between [h] and [ɦ] (Maddieson 1984: 57). If the two sound [h] and [ɦ] were in complementary distribution and could be analyzed as allophones of the same phoneme, Middle Mongolian would not need to bear this rare typological trait. Just such a solution is possible. The letter 𗥃 <h> does not occur as an Inlaut except rarely in cases also written with <ḥ>, e.g. *iheḥen/ḥiheḥen* 'protection' discussed above. The letter <ḥ> occurs as an Anlaut only before /ü/ and /i/. Miller points out that "Middle Mongolian iniital h- is not generally recorded in ḥPhags-pa script before Middle Mongolian -ü-" (1962: 443). In Poppe (1957) there is only one word where <h> proceeds the vowel /ü/, namely WM üre, PM hyre 'fruit, merit'.[5] Initial <h> is also rare before the vowel /i/. There are two words where <h> proceeds the vowel /i/ WM ičegüri, PM hič^{h}uḥuri 'shame' and WM irügel, PM hiruḥer 'benediction'. So, the segments [h] and [ɦ] are nearly

5 For some thoughts on this word and its initial h see Miller (1962: 443) and the sources quoted therein.

in complimentary distribution. The case for the phonemic unity of [h] and [ɦ] would be strengthend if these three words were also found spelled as ḥyre, ḥičʰuḥuri, and ḥiruḥer, but the absence of such forms is of no particular consequence when consideration is given to the relatively small size of the Ḥphags-pa corpus overall. The hypothesis that initial <ḥ> is a voiced allophone of <h> occuring before the vowels /i/ and /ü/ would be elegantly confirmed if evidence of initial /h-/ could be found in the four words WM *üge* 'word', *ügei* 'without', *ibegel* 'protection', and *irgen* 'people' which have initial <ḥ> in the Ḥphags-pa material. These words are not included in Pelliot's (1925) list of word that begin with /h/. Svantesson reconstruct WM *üge* 'word' and *irgen* 'people' without an initial /h/. However, it is worth noting that Bobrovnikov singles out the word *iregen* 'people' as an example of <i> being pronouced with aspiration and transcribes this word as *jirgen* and *hirgen* (1849: 8).

This investigation of the Ḥphags-pa letter <ḥ> as used in writing Mongolian has shown that this letter represents the sound [ɦ] both in Anlaut and Inlaut positions, and that this sound is an allophone of the phoneme /h/ with [ɦ] occuring intervocalically and initially before the vowels /i/ and /ü/ whereas [h] occurs before the other vowels.

The Ḥphags-pa letter ᠾ in Chinese

Although the Ḥphags-pa script was developed primarily for writing Mongolian, it was also intended to write all the languages of the realm. A significant amount of materials are extant in Chinese written in the Ḥphags-pa script. The question naturally arises what light if any the solution just proposed for the letter <ḥ> in Mongolian Ḥphags-pa can bear on the use of this same letter in Ḥphags-pa Chinese materials.

The letter <ḥ> as used in writing Chinese corresponds to the Middle Chinese initial category *yǐng* 影. The *opinio communis* holds both that this *yǐng* 影 initial represents a glottal stop in Middle Chinese, and that the letter <ḥ> represents a glottal stop in Ḥphags-pa Chinese (Ligeti 1961: 229, Nakano 1971: 75–80, Coblin 2007: 45–46). This interpretation of the letter <ḥ> as used in Chinese is thus at odds with the interpretation [ɦ] for the letter in Mongolian given above. Two approaches are available to explain this enigma. The first is to reconsider the wisdom of interpreting the letter <ḥ> as a glottal stop in Chinese. The second is to explain how the decision to write a glottal stop with <ḥ> might have been sensible despite <ḥ> having had the value [ɦ] in Mongolian.

Karlgren (1915: 377–379, 1923: 20 qtd. in Hope 1953: 2) was the first to suggest that the *yǐng* 影 should be understood as a glottal stop in Middle Chinese. Karlgren discusses the value of the *yǐng* 影 initial in relationship to the *yù* 喻 initial. His argument can be summarized as follows (1915: 377–379). In general the Chinese dialects and the foreign readings of the relevant characters lack initial consonants. Those dialects which do have a consonant here have the same consonant as they do for Middle Chinese enigma. This he credits to analogy. When assigning a point of articulation to these two initials only uvular and glottal are possible because the other positions are taken by other Middle Chinese initials. He rejects uvular articulation because no contemporary dialects point to this articulation. The rhyme tables mark the *yǐng* 影 initial with an open circle like they do the initial *k-*, and they mark the *yù* 喻 initial with a partially filled circle like the initial *g-*. However, because the *xin* 心 initial, which he reconstructs as *s-*, is also marked with this semifilled circle, Karlgren rejects the interpretation of this distinction as one of voicing. Instead he explains that *k-* is exploded, whereas *g-* and *s-* are 'plus doux', and suggests that *yǐng* 影 is a glottal stop initial and *yù* 喻 a vocalic initial.

This line of reasoning contains many errors. There are certainly various places of articulation that were available if he had been more creative. The zero initial in the modern dialects is just as strong evidence against a glottal stop as it is against a uvular. The distinction between 'k' and 'g' is exactly one of voicing, and *g-* is exploded just as *k-* is. Finally, it seems strange that Karlgren implies that he analyzes zero initial as a kind of laryngeal. Karlgren's case that the *yǐng* 影 initial is a glottal stop is rather weak.

Subsequently three types of evidence have been used to support the glottal stop reconstruction: the transcription of Chinese in the 唐 Táng dynasty with Tibetan script, the transcriptions made by Sin Sukchu 申叔舟 (1417–1475), and the Wu dialects of today.

Csongor finds that the *yǐng* 影 initial of Middle Chinese is transcribed in Táng dynasty Tibetan transcriptions by the Tibetan character ཨ (1960: 113–114). The Tibetan letter ཨ represents vocalic onset in Old Tibetan, this initial may have been articulated with a glottal stop initial, but it should be noted that the Tibetan script is not capable of noting a glottal stop as opposed to a vocalic onset (Hill 2005: 108–109). Consequently the transcription of the *yǐng* 影 initial by ཨ cannot be taken as evidence for a glottal stop *per se* in Táng Chinese.

Coblin points out that in 15th century "Sin Sukchu [申 叔 舟 (1417–1475)] recorded a glottal stop at exactly the points where the 'Phags-pa letter' - [Ḥphags-pa letter <ḥ>] occurs" (2007: 45). The *han'gŭl* character which Coblin following Kim (1991) takes to represent the glottal stop is ㆆ <q>. In contemporary Korean this character is no longer used. Kim provides no evidence for its phonetic value either in Middle Korean or in Chinese. While it is true *yĭng* 影 initials are transcribed with ㆆ <q>, this is an artificial practice produced because of an attempt to transliterate all of the initial categories of the rhyme books. In "1446 Hwun [25a] explicitly states that the glottal onset was not distinguished from the smooth in native Korean words" (Martin 1992: 49). To suggest that the *ying* 影 initial was a glottal stop because it was transcribed ㆆ <q> is a purely circular argument, in fact all the use of this letter shows is that the Korean phonologists, like Karlgren, wanted to distinguish the *yĭng* 影 in transcription even lacking evidence for its pronunciation. The letter ㆆ <q> as a final is used

> in non-Chinese expressions only for the prospective modifier [*lq*] '(...that is) to do/be', which had the effect of reinforcing the simple obstruents [...] when they began a following noun in close juncture [...] the coda ...*lq* represents a morphophonemic phenomenon rather than a string of two phonemes. (Martin 1992: 49–50)

In Middle Korean the letter ㆆ <q> was used as a sort of diacritic, used either to artificially distinguish the *yĭng* 影 initial when transcribing Chinese, or to mark gemination in indigenous words. The letter ㆆ<q> had no phonetic value itself, and its use to transcribe the *yĭng* 影 initial is in no way evidence that the latter was a glottal stop.

A number of researchers have pointed to the presence of a glottal stop in the Wu dialects in these syllables (Coblin 2007: 45). However, Hope questions the extent to which this is true or relevant (Hope 1953: 15). In particular some Wu dialects have a glottal stop, some do not, and some have one optionally. It is relatively easy for a language to develop a glottal stop to accompany a vowel initial. The evidence of the Wu dialects is not compelling without an argument for their reconstructibility at the Proto-Wu level.

All of the evidence pointed to for reconstructing the *yĭng* 影 initial as a glottal stop is inconclusive, and only the presence of a glottal stop in the Wu dialects is even suggestive of this conclusion. The use of the letter <ḥ> in Ḥphags-pa Mongolian would instead suggest a voiced glottal fricative

[ɦ]. However, despite the lack of evidence that the *yǐng* 影 initial is a glottal stop it does seem clear that it is voiceless.

> On might expect the "throat sounds" to be laryngeals. There is no doubt that the first of them, initial *yǐng* 影, was, as Karlgren argued, a glottal stop. It is represented in the foreign dialects and many modern dialects as a zero initial, but it acts like a voiceless initial in the LMC [Late Middle Chinese] register split in the tonal system and in other respects patterns like the voiceless un-aspirated initials at other places of articulation. (Pulleyblank 1984: 64).

In general the voicing of Tibetan letters is the opposite of the value of corresponding Ḥphags-pa letters in writing Chinese, e.g. Tibetan ཀ <k> [k] and ག <g> [g] but Ḥphags-pa <k> [g] and <g> [k], Tibetan པ <p> [p] and བ <b> [b] but Ḥphags-pa <p> [b] and <b> [p]. This voicing mismatch in the stops is itself an often contemplated mystery. However, Hattori has proposed the following solution, which (1946: 67), Hope (1953: 35); Norman (1988: 51), and Coblin (2007: 38) also agree to.

> 常時の蒙古人及び支那人は、蒙古語音と支那語音を比較する場合に、蒙古語の有聲乃至は半有声の音を支那語の無聲無気音と、蒙古語の無聲無気音を支那語の無聲有氣音と同一視するのがことんど常識であつたために、支那語の無聲無氣音は八思巴字の濁音字母で、支那語の無聲有氣音は八思巴字の次清音字母で寫すといふ主義が確立した。そこで、蒙古語にはない支那語の濁音（有聲乃至は帶氣音）を表はす必要が生じ、西蔵字の清音字から作つた字母をこれに當てることとなつた。
>
> [Because of the time, that Mongolians and Chinese when they compared the sounds of Mongolian and Chinese, would equate the sounds which are voiced or semi-voiced in Mongolian with the voiceless unaspirates of Chinese, and the voiceless unaspirates of Mongolian with the voiceless aspirates of Chinese was common sense, the principle was established that Chinese voiceless unaspirates are transcribed with Ḥphags-pa voiced letters and Chinese voiceless aspirates with Ḥphags-pa voiceless letters. So, when the need arose to represent the Chinese *zhuó* 濁 (voiced or aspirates) letters made from the voiceless of the Tibetan script were assigned to these.] (Hattori 1946: 67).

To match this general voicing mismatch perhaps the letter <ḥ> should be taken as representing [h] in Chinese, or in general the voiceless correspondent of the letter ཧ <h> which Nakano understands as indicating [ɦ] (1971: 80) <h>. On the other hand, the fricatives do not generally show this voicing mismatch. Whatever the solution may be it would behoove Chinese phonologists to carefully reexamine the evidence of the Ḥphags-pa script, and more the association of the *yǐng* 影 initial with a glottal stop more generally. As Coblin has stressed Ḥphags-pa Chinese is not necessarily a direct descendant or a direct ancestor of any other attested form of Chinese (2007: 44), therefore there is perhaps room to believe that the letter <ḥ> did not represent a glottal stop in Ḥphags-pa Chinese, even if one accepts that the *yǐng* 影 initial was a glottal stop in other forms of Chinese. The conclusion which best reconciles the Ḥphags-pa evidence with the evidence of the Middle Chinese rhyme books is that the *yǐng* 影 initial in Ḥphags-pa Chinese was articulated as a voiceless glottal fricative.

The analysis of the *yǐng* 影 initial as a glottal stop appears to be an entrenched tenet of historic Chinese phonology, so anticipating that historic Chinese phonologists are loathed to part with this belief, it is worth addressing whether even if one takes for granted the view that in Ḥphags-pa Chinese the letter <ḥ> represents a glottal stop, one can explain why this letter would be used in this way in Ḥphags-pa Chinese when it did not have this use in Tibetan or in Mongolian. In order to explain this anomaly consideration must be given to the sound system of Ḥphags-pa Chinese and the graphic system of the Ḥphags-pa script in general, and specifically the use of the letter ཨ. Most researchers (e.g. Hashimoto 1978–79: 100) have taken the letter ཨ to represent a zero initial. In contrast, Cheng takes it as a voiced velar fricative [ɣ] (1985: 80), and Coblin as a voiced glottal fricative [ɦ] (2007: 48). If Cheng or Coblin are correct than the use of the Ḥphags-pa letters ཨ [ɣ/ɦ] and ཀ [ʔ] are the exact oppositve of their Tibetan ancestors ཨ [Ø/ʔ] and འ [ɣ/ɦ]. Hope noticing this reversal sees it as the same phenomenon of the voicing mismatch in the stops (1953: 35–36). This solution is not at first glace applicable to the mismatch of ཨ [ɣ/ɦ] and ཀ [ʔ] with ཨ [Ø/ʔ] and འ [ɣ/ɦ], because they are not a voiced and voiceless pair. Hope is able to see the reversal of ཨ [ɣ/ɦ] and ཀ [ʔ] as part of the same phenomenon of voice mismatch in the stops because he sees the difference in the stops as one of tone and not voicing, and he also sees the difference between ཨ 'clear null' and འ 'muddy null' as one of tone (Hope 1953: 36). In his favour, in the Central Tibetan languages the initial /ɦ/ corresponding འ has been analyzed by some linguists as not

phonemic but rather a phonetic effect of the low tone zero initial (Haller 2000: 22). But even so, why would the value of these two characters be reversed? Hope says it is by 'extending the analogy' (1953: 36) present in the stops. This presumed analogy could be diagramed thus.

Tibetan ག <g> 'muddy k' : Ḥphags-pa Chinese ག <g> 'clear k'
Tibetan ཧ <ḥ> 'muddy null' : Ḥphags-pa Chinese ཧ 'clear null'

However such an analogy was not extended in the case of the dental fricatives. The Ḥphags-pa characters ས <s> and ཟ <z> correspond perfectly to their Tibetan ancestors ས <s> and ཟ <z>. If Hope is right that the main distinction in the stops is one of tone rather than voicing, and that analogy is sufficient to explain the reversal of these two characters, the problem can be regarded as solved. But because neither of these assumptions, particularly the latter is compelling, one should consider other solutions.

If Cheng and Coblin are wrong about the phonetic value of འ the correspondence becomes Chinese Ḥphags-pa འ [Ø] and ཧ [ʔ] with Tibetan འ [Ø] and ཨ [ɣ] and Mongolian Ḥphags-pa འ [Ø] and ཧ [ɦ]. The use of ཧ to represent [ʔ] rather than [ɦ] can be relatively accounted for if Ḥphags-pa Chinese lacked the sound [ɦ]. If this were the case, then the Ḥphags-pa script as used to represent Mongolian would have a character superfluous for writing Chinese, and Chinese would have a sound [ʔ] which the Ḥphags-pa script had no preexisting letter for. Because the letter ཧ was not needed to represent [ɦ] in Chinese it was free to represent [ʔ] instead.

One might object that since there certainly are Ḥphags-pa letters invented specifically for Chinese which are not employed in Mongolian, why did Blo gros rgyal mtshan not simply invent a new letter for [ʔ]. When new letters were invented for the Ḥphags-pa script that not were directly based on Tibetan originals they were derived either by modifying preexisting Tibetan characters or Devanāgarī characters (Hashimoto 1978: 85–92). Devanāgarī has no letter for the glottal stop. No Devanāgarī characters exists to serve as the prototype for a Ḥphags-pa letter that would represent a glottal stop. In the Tibetan alphabet there is also no character for a glottal stop, the only glottal characters being h and [ɦ]. Since the letter ཧ represented a glottal fricative, a sound lacking in Chinese, it could be used for the glottal stop without the need to invent a new letter.[6]

6 Some researchers understand the Tibetan letter འ to represent [ʔ]. This might lead one to expect འ, or a modified version of it to represent [ʔ] in Chinese. For whatever rea-

This explanation supposes that the Chinese underlying the Ḥphags-pa transcriptions has no voiced glottal fricative [ɦ]. However, this assumption is not generally agreed to, Coblin analyzes ᠬ as a voiced glottal fricative, and Nakano understands ᠬ to represent [ɦ] (1971: 80). Another weakness in the suggestion that ᠾ represents a glottal stop, ᠬ a zero initial [Ø], and there is no voiced glottal fricative in Ḥphags-pa is the evidence that Cheng points to that ᠬ be interpreted as [ɣ] (1985: 80). Namely, that the 古今韻會舉要 *Gǔjīn yùnhuì jǔyào* describes this letter with the phrase 角次濁次音 'voiced velar fricative' (Cheng 1985: 80, Coblin 2007: 48).

In conclusion, I offer two proposals. Either ᠾ represents a voiceless glottal fricative in Chinese, or ᠾ represents a glottal stop and Chinese Ḥphags-pa has no voiced glottal fricative. Neither of these solutions is fully satisfactory, and hopefully this enigma will receive a more satisfactory solution in the hands of Chinese phonologists now equipped with a better understanding of the use of this letter in Mongolian.

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son this is not the strategy employed. Perhaps because as in my own view ᠬ never has represented [ʔ] in Tibetan.

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